Size Adjustable Prosthetic Forearm

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Prosthetic arms are expensive. Without insurance, for a prosthetic arm one can be expected to pay anywhere from $2,000-$10,000 for a cosmetic and between $20,000-$100,000 for a functional arm. The expenses keep building when you consider that prosthetics need to be replaced ever 2-4 years. There are many reasons as to why they are so expensive, one of the biggest factors being that they are personalized to people's size, preferences, and other so they cannot be mass produced. The goal of our project is to create a design of forearm prosthetics that can be size adjusted, a model that can be mass produced and sold cheaply. 3D printing has made it possible to produce prosthetics that much cheaper, such as the VenusArm model. However, not everyone has easy access to 3D printers which are required for this prosthetic. Our goal is to create a model that can theoretically be mass produced in and shipped around the world, easily accessible for everyone. Our original design plan was to create the arm out of carbon fiber and to also create our own hand, but due to practical issues and time constraints our team was not able to require all of the desired material. Instead, we decided to 3D print the physical structure of the prosthetic arm and hand. We borrowed a hand model from Thingiverse.com, no need for us to reinvent the wheel, but the arm design and EMG-Arduino-servomotor which powers the arm is our original creation. The 3D printing may seem like we are failing in the point established in the previous paragraph, but we are only 3D printing as it is the most convenient material available to us; the arm's design is not dependent on 3D printing. We were able to create a simple prosthetic forearm capable of gripping bars, picking up cups, and being size adjusted.

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